



ROUTE CONCEPT REPORT

INTERSTATE 405 SAN DIEGO FREEWAY 12-ORA P.M. 0.23/24.18



NOVEMBER 1999



ROUTE CONCEPT REPORT

INTERSTATE 405

SAN DIEGO FREEWAY

12-ORA P.M. 0.23/24.18



PREPARED BY DISTRICT 12 DIVISION OF PLANNING

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**ROUTE CONCEPT REPORT
INTERSTATE ROUTE 405
SAN DIEGO FREEWAY
12-ORA-PM 0.23/24.18
SUMMARY**

INTERSTATE ROUTE 405

Interstate 405 (I-405) also known as the San Diego Fwy has 24.18 miles located in Orange County and 48.2 miles located in Los Angeles County. It is considered a bypass route to the Santa Ana/Golden State Fwy (I-5). Within Orange County, I-405 is a controlled access freeway with 8 to 12 mixed flow lanes and 2 High Occupancy Vehicle (HOV) lanes. Additionally, there are auxiliary lanes in selected portions of the route. These auxiliary lanes act as a safety/operational improvement by providing adequate weaving which, in turn, allows the through lanes to maintain their full design capacity.

I-405 provides access between cities that are located in both Orange and Los Angeles Counties. It is used for commuting and inter-regional travel along with direct and indirect access to employment centers, recreational attractions, shopping malls, medical centers, universities, airports, etc. The average daily traffic (ADT) ranges from 153,000 just north of the I-5/I-405 interchange (El Toro Y) to 340,000 between the Garden Grove Fwy (SR-22, PM 20.75) and Los Alamitos Blvd (PM 22.64).

ROUTE CONCEPT

The concept for this route is to provide the best Level Of Service (LOS) possible and reduce the duration of congestion. If no major capital improvements are made, it is anticipated longer traffic delays will occur. For planning purposes, the route has been divided into segments shown below. Changes are shown in bold italics.

Seg No.	POSTMILE	LIMITS	1997 No. Lanes Peak Hr LOS	2020 Concept No. Lanes Peak Hr LOS	TOPS LOS
1	0.23/1.80	I-5/SR-133	6+2 HOV Lanes /F3	<i>8+2 HOV Lanes + Aux /F0</i>	D
2	1.80/8.74	SR-133/SR-55	8-10+2 HOV Lanes /F3	<i>8-10+2 HOV Lanes + Aux /F2</i>	E0
3	8.74/10.79	SR-55/SR-73	10+2 HOV Lanes /F0	<i>8-10+2 HOV Lanes + Aux /F0</i>	E0
4	10.79/16.54	SR-73/SR-39	8-10+2 HOV Lanes /F0	<i>10-12+2 HOV Lanes + Aux /F2</i>	E0
5	16.54/20.75	SR-39/SR-22	8+2 HOV Lanes /F1	<i>10+2 HOV Lanes + Aux /F0</i>	D
6	20.75/24.18	SR-22/L.A. Co Line	8-12+2 HOV Lanes /F2	<i>8-12+4 HOV Lanes /F0</i>	E0

The I-405 route concept calls for additional improvements within some of the segments to improve the flow of traffic on I-405. These improvements include: (1) Construct auxiliary lanes from SR-133 northbound connector (2) Construct a HOV Direct Connector along with drop ramps at the I-405/SR-55 interchange. (3) Improve the SR-73/I-405 interchange along with other operational improvements to I-405 between Bear St. and Euclid St. (4) Connect the proposed extension of SR-57 (Santa Ana Viaduct Expressway) to both I-405 and SR-73. (5) Construct HOV a Direct Connector between the existing HOV lanes on I-405 and the planned HOV lanes on I-605 and SR-22.

The concept also calls for the addition of an equivalent freeway lane in each direction in segments 4, 5, and 6. This added capacity could be an added HOV lane, mixed flow lane or transit service in the corridor equivalent to reducing the demand on the freeway by one lane in each direction.

HOV drop ramps at various locations along the corridor are also part of the concept. Currently drop ramps at Von Karmon Av and Bear St have been identified.

With these improvements the LOS would be at "F" (congestion) in the year 2020 for the entire length of the route.

Traffic management elements such as ramp metering, changeable message signs and closed circuit television cameras, with operational control from the Traffic Management Center (TMC), is an integral part of the concept for I-405 as well as other urban freeways; bringing these highways up to full Urban Freeway Standards. New Technology implementation is also a part of the route concept wherever applicable.

Finally, this concept calls for a new strategy emphasizing system management and operational improvements of our existing freeway system in a way that optimizes the carrying capacity referred to as Traffic Operations Strategies (TOPS). It is an operational strategy that will maximize the utilization of the existing urban freeway system through performance-based investment strategies. Currently, the district with the cooperation of the other southern California districts is developing a system wide concept report for Southern California. If fully implemented, the concept for this route could improve to a Level of Service (LOS) of "E" which will reduce delay to motorists and the trucking industry. *See Traffic Operations Strategies (TOPS) on page 20.*

WILL INSERT MAP BEFORE CIRCULATION

Route Concept Report

STRIP MAP

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ACRONYMS GLOSSARY

ROUTE CONCEPT REPORT

STATEMENT OF PLANNING INTENT

The Route Concept Report (RCR) is an internal planning document which expresses the

Department's judgment on what the characteristics of each state highway should be in response to proposed land use and projected travel demand over a 20-year planning period. RCRs are prepared in the districts and represent the combined expertise of district, local and regional agencies staff.

The RCR contains the Department's goals for the development of each route in terms of Level of Service (LOS). One of the Department's goals is the proposed concept of Traffic Operations Strategies (TOPS). The RCR broadly identifies the nature and extent of improvements needed to reach those goals. More specific design and operational detail will be included and analyzed in subsequent project development documents such as Project Study Reports, Environmental Documents, Project Reports and Preliminary and Final Design. These concept reports are used in the development of the District System Management Plan and other state and local planning and project development documents.

The traffic data for this report has been prepared for the following alternatives: Base year 1997, year 2020 Null (project under construction and funded), year 2020 concept and year 2020 TOPS. The LOS for this concept report is based on the ratio of Year 2020 forecast volume over capacity while the Year 2020 TOPS forecast is demand over capacity for each segment of the roadway. The LOS shown in Table 7 (ADT Summary Table) on page 23 is for peak hour/peak direction. See *Appendix 1 - Graphic Representation and Definition of Levels of Service*.

In developing this RCR, the System Planning Branch considered using the metric system for designating segment limits and other significant points along this route. It was decided that it would be inappropriate for System Planning to perform even a soft conversions at this point in the planning process. System Planning will begin using the metric system in RCRs and other System Planning documents when the postmile system is converted and a standard set of data is in use throughout the District.

Information contained in the RCR is subject to change as conditions and priorities change and as new information is obtained. The nature and size of identified improvements may change as they move through the project development stages, with final determinations made at the time of project planning and design. Changes that occur during project development may require revision of the RCR.

Preparation of this report included field reviews, review of planned and programmed projects, review of previous RCRs prepared for this route, projects under construction, and analysis of Level of Service. Internal documents from Traffic, Maintenance, Project Development and Programming, and external documents from the County of Orange Environmental Management Agency (OCEMA), Orange County Transportation Authority (OCTA), and Southern California Association of Governments (SCAG) were referenced for this RCR. Coordination with the Advanced Planning/Intergovernmental Review Branch was also undertaken to ensure consideration of external issues impacting this route.

ROUTE DESCRIPTION - INTERSTATE 405 (I-405)

I-405 (San Diego Freeway) is a north-south route which 23.9 miles are located in Orange County (District 12) and 48.2 miles are located in Los Angeles County (District 7). Within Orange County I-405 passes through six cities (Irvine, Costa Mesa, Fountain Valley, Huntington Beach, Westminster, and Seal Beach). The route passes through fully developed portions of the county except south of Jeffrey Rd where currently there is open space and

agricultural land uses. The route is considered flat in Orange County.

The portion of the route that is located in Orange County has two HOV lanes. Since the completion of the I-5/I-405 interchange (El Toro Y Project) in March 1997, motorists can transition from route to route by means of HOV Direct Connectors. Upon completion of HOV lanes in Los Angeles County, there will be continuous HOV lanes for the entire length of I-405.

History

I-405 was originally added to the State Highway System as Route 158 in 1933 and then added to the Freeway & Expressway System in its entirety in 1959. Construction started in 1964 and completed in 1969. The HOV lanes in Orange County were completed in 1991. The I-5/I-405 HOV Direct Connector was completed in 1997.

CURRENT ISSUES/PROBLEM IDENTIFICATION

El Toro Marine Corp Air Station

The Marine Corps Air Station (MCAS) El Toro near the City of Irvine consists of 4,738 acres adjacent to the convergence of I-5 and I-405. MCAS has operated as a military base since 1943 and currently maintains a wide variety of military support and training operations for the United States Marine Corps. The Federal Government made a decision in 1993 to close MCAS by mid 1999. A draft Environmental Impact Report (EIR) for the community

reuse plan has been prepared by the County of Orange, which was designated by the Department of Defense as the Local Redevelopment Authority (LRA).

The LRA has recommended approval of several applications by federal agencies for use of portions of the site, including navigation facilities requested by the Federal Aviation Administration (FAA), a habitat reserve requested by the Department of Interior, and several buildings to be used by the Air National Guard. The state and local interests are also considering proposals for the re-use Base.

All alternative land uses, whether it be for a commercial airport or general land use will add substantial traffic to the local arterials system and will impact the nearby interchanges with I-5, SR-133 and SR-241. If a commercial airport is selected, it may require direct connector ramps to the adjacent transportation facilities to better manage the traffic impacts.

As yet, no final decision has been made regarding the future of this site. Our traffic numbers do not currently reflect the re-use of the Base. As re-use decisions are made, Caltrans will be proactive in access planning, development and review.

Add Northbound Auxiliary Lanes at SR-133

Currently, the connector from SR-133 to northbound I-405 has two lanes that merge to a single lane, then merges onto the northbound I-405 just before Sand Canyon Av. In order to improve the operation of northbound I-405 in this area, it is recommended to add an auxiliary lane from SR-133 to Sand Canyon Ave, one from Sand Canyon Ave to Jeffrey Rd and one from Jeffrey Rd to Culver Dr.

Add Southbound Auxilliary Lanes between Culver Dr and MacArthur Blvd

Southbound auxilliary lanes are programmed in the STIP for 2002 construction. These lanes will be constructed between Culver Dr and MacArthur Blvd – EA 08620k.

Tustin US Marine Corp Air Station

The Tustin Air Station is located approximately 2 miles north of the SR-55/I-405 interchange. The nearest ramps to I-405 are at Jamboree Rd and MacArthur Blvd. The proposed land use calls for low density housing along with supporting commercial development. The City of Tustin is preparing an environmental document regarding this land site. It is not known at this time what impacts this will have on I-405.

SR-55/I-405 HOV Direct Connector Project

SR-55/I-405 interchange is one of the ten most busiest in the nation. To improve congestion and circulation, HOV connectors will be constructed connecting the HOV lanes that are on both SR-55 and I-405. At the present time this project is scheduled to be completed by early 2004. Funding is committed by OCTA (Measure M).

SR-55/SR-73/I-405 Improvements

Construction began in June of 1999 and expected to be completed by mid 2004. Project involves adding a mixed flow lane and HOV lane in each direction of SR-73 from I-405 to Birch St; add connector loop linking northbound SR-73 to southbound SR-55; add

auxiliary lane on northbound I-405 between Harbor Blvd and Euclid St including widening of the Santa Ana River Bridge and ramps modifications; and on I-405 from Bear St to Harbor Blvd realign local access ramps, widening connectors at SR-73/I-405 interchange and add auxiliary lanes

SR-57 Connectors

Connections to the proposed extension of SR-57 (Santa Ana Viaduct Expressway) from I-405 to SR-73 are under study by National Transportation Authority (NTA, the franchisee for SR-57 toll road extension). Several Alternatives are being considered for connecting SR-57 to both I-405 and SR-73. However, the SR-57 extension project is in the early stage of conceptual design. No date is set for completion of the EIR.

SR-22/I-405/I-605 HOV Lanes and Direct Connectors

With the HOV lanes that are programmed on I-605 between I-405 and I-105, the HOV lanes that are planned on SR-22 and the existing HOV lanes on I-405, weaving conflicts may increase in the mixed flow lanes due to HOV users transitioning from route to route. Orange County Transportation Authority (OCTA) is preparing a Project Report/Environmental Document (PR/ED) for HOV lanes from SR-55 to I-605 which would add one more HOV in each direction for this portion of I-405, and two Direct Connectors, one at SR-22/I-405 and the other one at I-405/I-605. This would reduce weaving patterns that may exist in the mixed flow lanes once the HOV lanes are constructed.

HOV Lanes

For planning purposes, the HOV volumes were combined with signal drivers volumes and the HOV lane was combined with the freeway lanes to calculate one V/C ratio and Levels of Service (LOS) for each segment of the route. Year 2020 forecasts indicate that there will be too many 2+ HOV vehicles in the peak hours to continue to operate this route and system as we do today. Between now and Year 2020, the 2+ HOV issue along with dedicated lanes will have to be addressed.

Center Line Project

Orange County Transportation Authority (OCTA) has proposed an Urban Rail System connecting major activity centers in Orange County from Fullerton to Irvine. The Orange County Corridor Urban Rail known as the “Center Line Project” proposes an initial 28-mile advanced rail transit from Fullerton Transportation Center in north Orange County to Irvine Transportation Center in central Orange County. This element will provide the connection with the regional transit elements of Amtrak and Metrolink commuter rail services at three locations: Fullerton, Anaheim and Irvine. The urban rail system will provide transit services to major employment, retail and entertainment sites in central Orange County. This project would have an impact on the I-405 corridor.

ROUTE PURPOSE AND CLASSIFICATION

I-405 serves several purposes in Orange/Los Angeles Counties. It is a bypass route to I-5. It is also an inter-county and intra-regional route which intersects two Interstate Routes (I-5 and I-605) and five State Routes (SR-133, SR-55, SR-73, SR-39, and SR-22) in Orange County. It is a major goods movement facility into and out of Orange and Los Angeles Counties along with significant amount of recreational and commuter trips.

Federal/State Functional Classification

I-405 is classified as an Interstate Facility (P1P) throughout Orange County.

Following are other designations which may affect planning and/or operations on I-405.

<u>DESIGNATION</u>	<u>LIMITS</u>
o National Highway System (NHS)	Entire length of I-405
o <u>S</u> ubsystem of <u>H</u> ighway for the movement of <u>E</u> xtra <u>L</u> egal <u>L</u> oads (SHELL)	Entire length of I-405
o National Network for STAA Trucks	Entire length of I-405
o 12 Foot Wide Arterial System	Entire Length of I-405
o Lifeline Route	8.74/24.18 (SR-55 to L.A. Co. Line)

Orange County

I-405 is shown as a State Freeway on the County Master Plan of Arterial Highways (MPAH). The MPAH identifies freeways for reference purposes only.

ROUTE ANALYSIS

I-405 in Orange County is a controlled access freeway. The number of lanes varies from 8 to 14. The segment from I-5 to SR-133 is 8 through lanes. The segments from SR-133 to SR-39 are 8 to 12 through lanes. The segment from SR-39 to SR-22 is 10 through lanes. And in the segment from SR-22 to I-605 is 8 to 14 through lanes. In selected portions of the route there are auxiliary lanes.

The northbound and southbound roadway of I-405 varies from 44 feet to 92 feet. The outside shoulders vary from zero to ten feet and the inside shoulders vary from 2 feet to 25 feet.

Parallel Alternative Facilities

There are several existing parallel alternatives to I-405. Included among these are: I-5 in Orange/Los Angeles Counties and SR-22 in central Orange County. The main parallel arterial highways for portions of the route are: Main St between Culver Dr and SR-55, MacArthur Blvd/Talbert Av between Red Hill Av and Gothard St, Irvine Center Dr./Edinger Av between I-405 and Bolsa Chica St, Alton Pkwy between I-5 and Red Hill Av, and SR-1. The arterials are not true parallel alternatives because I-405 runs diagonally to the street grid in north Orange County.

The San Joaquin Hills Transportation Corridor (SR-73), a toll facility, provides another alternative route.

Land Use/Growth

Orange County encompasses 790 square miles and has a population of 2.7 million people. For transportation planning purposes, Orange County is considered to be a fully urbanized county. The county is a continuation of the greater Los Angeles metropolitan area with the Pacific Ocean to the west, the Cleveland National Forest to the east and the Camp Pendleton Marine Corps Base to the south. The majority of the land in the county not within or adjacent to the boundaries of the national forest is developed. The primary land use is residential, with pockets of retail commercial, light industrial and professional office spaces. Industrial and commercial uses usually border freeways and major arterials.

For the purpose of this report, the county is roughly divided into north and south by SR-55 from Newport Beach to Chapman Av in the City of Orange. The dividing line turns east on Chapman Av to Santiago Canyon Road east of Silverado Canyon Road east to Orange/Riverside County Line. North County lies west of SR-55 and north of Santiago and Silverado Canyon Road. In this older portion of the county, most of the street system is based on the arterial grid. South County lies south of Santiago and Silverado Canyon Road and east of SR-55. South County contains much more new development and the street pattern meanders with the contours of the land. See Exhibit 1 on the following page, Route Concept County North/South Split.

Based on the 1997 estimates the Orange County population is 2.7 million. By the year 2020 the population is expected to grow to approximately 3.2 million (19% increase) with 50% of the increase in the north. Given these numbers, the county population distribution in year 2020 is projected to be 57% in the north and 43% in the south. Although the majority of growth is

Exhibit 1**Route Concept****Orange County North/South Split**

expected to occur in the south, the north will continue to be the more populous area of the county. See table 1, Population Growth/Distribution.

Based on the 1997 estimates the Orange County job base is approximately 1.3 million. By the year 2020 the job base is expected to grow to approximately 2.1 million (61% increase) with 50% of the increase in the North. Given these numbers, the county job base distribution in year 2020 is projected to be 55% in the North and 45% in the South. As with population projections, the majority of growth is expected to occur in the South, yet the North will continue to have a higher concentration of jobs. See Table 1.

Table 1: Population Growth/Distribution - 2020

	Year	% in	% in	Year	% in	% in
--	------	------	------	------	------	------

	1997	north county	south county	2020	north county	south county
Population	2.7*	58%	42%	3.2 *	57%	43%
Employment	1.3*	58%	42%	2.1*	55%	45%

* In Millions

The land uses along and around I-405 reflect the diversity of the land uses of the entire county. Those land uses include residential (from low to high density), retail commercial, industrial, institutional and recreation/conservation open space. With just under half of the expected growth in population and employment in Orange County by 2020 occurring in the North it will be important, not only to the county but to the region, to maintain the highest possible level of service on I-405.

I-405 is somewhat unique in that many of the commuter trips on the facility are inter-county and intra-regional in nature. This route serves as a major commuter route between Orange County and Los Angeles County as well as being a bypass route to I-5. In addition to the commuter trips, there are traffic generators and attractions in the vicinity of I-405 in Orange County as well as some being in Los Angeles County. These are:

- Laguna Hills Mall
- Irvine Spectrum Entertainment Complex
- Irvine Meadows Theater
- Western State University College of Law in Irvine
- Irvine Medical Center
- University of California, Irvine
- John Wayne Airport in Santa Ana
- Coastal Attractions between Laguna Beach and Seal Beach
- Orange County Fair Grounds in Costa Mesa
- Orange County Performing Arts Center in Costa Mesa
- South Coast Plaza in Costa Mesa
- Huntington Beach Mall
- Westminster Mall
- Los Alamitos Racetrack
- United States Naval Weapon Station in Seal Beach
- California State University, Long Beach
- Long Beach Municipal Airport
- Los Angeles International Airport
- Los Angeles and Long Beach seaports and harbors

The growth forecasts for this report are based on Southern California Association of Governments (SCAG) 2020 forecasts.

Military Operations

The impacts of closure of the El Toro Marine Corps Air Station and the Tustin US Marine Corps Air Station within the vicinity of on I-405 are not known at this time. See CURRENT ISSUES information on El Toro Marine Corps Air Station and the Tustin US Marine Corps

Air Station.

Bus

Orange County Transportation Authority (OCTA) is the primary bus transit provider in Orange County. There are only three bus routes that travel via I-405 at this time:

Bus Routes

211	Irvine to Seal Beach
306	Irvine to San Juan Capistrano
316	Costa Mesa to San Juan Capistrano

Bus route 1 runs parallel the entire length of I-405 between San Clemente to Long Beach on SR-1. Parallel streets with bus routes serve primary local trips only.

Major Bus and Park and Ride Transportation Centers

The Park and Ride Program is an integral element of long term operation strategies for the state highway system, not just in Orange County, but throughout the region. Caltrans and OCTA work in concert to develop Park and Ride solutions in Orange County to complement the freeway system, and more importantly, to complement the HOV network. HOV lanes are currently existing, programmed or planned for each existing freeway in Orange County.

Currently there are 7 Park and Ride lots in the vicinity of I-405 in Orange County. See Table 2 on the following page for more detailed information regarding these lots. One of the Park and Ride lots is dedicated full time to transportation purposes. The other Park and Ride lots are "shared use" lots. Shared use lots are located where churches, shopping centers or other businesses dedicate a portion of their existing parking lot for park and ride use. Often times the entity name will be placed on guide signs directing motorists to their parking lot.

TABLE 2
List of Park and Ride Lots

Name of P&R Lot	Location	# of Spaces
Western Digital Corporation	Irvine Center Dr @ Spectrum	10
Shepherd of Peace Lutheran Church	18182 Culver Dr	59
South Coast Plaza	3333 Bear St – Top Deck	50
King of Glory Lutheran Church	10280 Slater St	36
United Methodist Center of the Good		

Shepherd	8152 McFadden Av	42
Golden West Transportation Center	Gothard St @ Center Av	124
Federal SW Regional Lab	4665 Lampson Av	66

as of

11/99

It is important to mention that there are other Park and Ride lots located in Los Angeles County within the vicinity of I-405. These lots contribute to the ridesharing effort on I-405 into and through Orange and Los Angeles Counties.

Bicycle Facilities

Bicycles are not permitted on any portion of I-405. Bikes are permitted on all arterials in the vicinity of I-405. Class I Bikeways that parallel a portion of I-405 are on Bristol St, Anton Blvd and Sunflower St in the City of Costa Mesa. Class II Bikeways that parallel a portion of I-405 are on Main St, Yale Loop, Alton Pkwy, and Michelson Dr in the City of Irvine. Two Class II bike routes that crosses over I-405 are Yale Av in the City of Irvine and Heil Av in the City of Huntington Beach. See Appendix 3 for bikeway classification information.

Rail

The Irvine Transportation Center is a train station located approximately 3 miles from I-405 on Barranca Pkwy in the Irvine Spectrum area. This station sits on the Los Angeles to San Diego (LOSSAN) Rail Corridor which primarily serves the I-5 Corridor. Both Amtrak and Metrolink trains make stops at this station. Refer to Exhibit 2 on the following page, a Metrolink System Map.

Exhibit 2 Metrolink System Map

TRAFFIC ANALYSIS

Introduction

I-405 is a bypass route to the I-5 which splits off from the I-5 in the City of Irvine in Orange County and rejoins again to I-5 in the City of Los Angeles in Los Angeles County. It is a major link between Orange and Los Angeles Counties which provides intra-regional, inter-regional access to the Southern California Region. During the week this route is a heavily used commuter route between the two counties. On weekends the route serves recreational trips between Orange and Los Angeles Counties as well as the San Diego area. I-405 experiences heavy congestion 7 days per week. Even with the completion of the HOV lanes in 1991 in Orange County, I-405 still experiences LOS "F" for most of its length.

Given the latest demand on the facility, It may be impossible to add enough capacity to bring the LOS up above the "F" level. It is being recommended to fully implement the traffic management elements of the Urban Freeway on this route in order to manage the system as a whole, via the state of the art Traffic Management Center (TMC). It is also recommended to

develop transit service that will reduce the number of solo drivers, especially with the completion of HOV lanes on I-405.

Average Daily Traffic

The ADT Summary Table 7 for I-405 is on page 23. There are four time frames given for this information: Existing, Year 2020 Null (do nothing), Year 2020 Concept and 2020 TOPS . The existing data was collected from the *1997 Traffic Volumes on California State Highways* book and from Los Angeles Regional Transportation Study (LARTS) base year forecast. Other sources of information used for existing volumes may include; count stations and other information taken from previously completed environmental documents and projects related studies.

The future traffic data presented in this document is a product of Los Angeles Regional Transportation Study LARTS) model. The peak hour traffic volume, peak hour direction volumes, and LOS are all products of the LARTS transportation model.

Transportation Modeling Description and Socioeconomic Summary

The future traffic data presented in this document is a product of the Los Angeles Regional Transportation Study (LARTS) transportation model. The LARTS model simulates the interaction between socioeconomic factors and the transportation system. The LARTS model is a socioeconomic driven transportation model. Among existing and projected socioeconomic variables used in the development of the LARTS model are; population, employment and income. The transportation system includes highway and transit service (includes rail service).

The Southern California Association of Governments (SCAG), in cooperation with state and local county government (Los Angeles, Orange, Riverside, San Bernardino, Ventura and Imperial) prepared the socioeconomic forecast for the year 2020. In April 1998, SCAG completed the Regional Transportation Plan (RTP) Community Link 21, the long ranged transportation plan for the SCAG Region. The inputs used in traffic forecast for this RCR are identical to SCAG's RTP. Table 3 on the following page provides a summary of the socioeconomic variable input for the year 2020 at the county and region level.

TABLE 3

Socioeconomic Data - Orange County/Region

Socio-Economic Data	Year 2020-Orange County	Year 2020-Region *
Population	3,206,020	20,632,271
Housing	1,094,024	7,151,115
Employment	2,101,316	10,028,476

*Los Angeles, Orange, Ventura, and Metropolitan portions of Riverside and San Bernardino counties.

Goods Movement - Truck Volumes

According to the publication *1997 Annual Average Daily Truck Traffic on the California State Highway System*, truck volumes on I-405 in Orange County range from approximately

7,550 to 19,680, 4.9% and 7.1% of the ADT respectively. The low occurs in the vicinity of I-5 (Segment 1) and the high in the vicinity of SR-22 (Segment 5).

Traffic Systems Management

Traffic Systems Management is a strategy for improving mobility on the transportation system without adding capacity. The theory is to implement operational improvements and disseminate motorist information to achieve the maximum operating efficiency of the transportation system. In particular, Caltrans' goal is to develop all freeways in Orange County to full Urban Freeway Standards. Integral to this development is the Traffic Operation Systems (TOS) Plan and the system elements outlined in it. See Appendix 5 - Urban Freeway Standards for an introduction to the TOS Plan and its system elements.

Currently there are thirteen existing Closed Circuit Television (CCTV) cameras, twelve south of SR-55 (PM 8.74) and one south of SR-22/I-405 interchange (PM 20.75). CCTV cameras will be added north of SR-55 are expected to be completed by the year 2001. All CCTV cameras will be connected by fiber optic cable and tied into District 12's Traffic Management Center (TMC).

Exhibit 3

TRUCK PERCENTAGES OF AADT

Accident Rates – Automobiles

The accident rate information shown in this report is taken from Table B of the Traffic Accident Surveillance and Analysis System (TASAS). This information should be used for general planning purposes and as an indicator of how the accident rate of a particular segment of a route compares to the accident rate averages on similar routes statewide. Higher than average rates described in this report is not alone an indicator of a significant problem, since accident rates can be greatly influenced by the length of the segment and the time period being measured. See Table 4 below for Table B information on I-405.

The Accident Surveillance Procedures Manual developed by the Division of Traffic is used to ensure that Caltrans has statewide consistency in identifying safety problem locations for developing recommended solutions. One tool used in this process is the TASAS Table C report list high accident concentration locations and uses an automated system for flagging locations requiring investigation.

Highway safety on state highways is Caltrans highest priority. Identification of safety problem areas is a continuous process. After a safety project is identified, it is prioritized as soon as possible and programmed in either the State Highway Operation and Protection

Program (SHOPP), or through the District minor Program. For more detailed information please refer to the Caltrans Accident Surveillance Procedures Manual.

The chart below shows that between January 1, 1997 and December 31 1998, the Actual Total Accident Rate exceeds the Average Total Accident Rate in segments 3 and 4.

Table 4

**Accident Rates from TASAS
(Table B)**

I-405

1/1/97 through 12/31/98			ACTUAL			AVERAGE		
			FATAL	FATAL & INJURE	TOTAL	FATAL	FATAL & INJURY	TOTAL
1	0.00/1.80	I-5 to SR-133	0.010	0.15	0.62	0.004	0.25	0.75
2	1.80/8.74	SR-133 to SR-55	0.003	0.16	0.63	0.005	0.29	0.88
3	8.74/10.28	SR-55 to SR-73	0.003	0.25	1.03	0.005	0.32	0.97
4	10.28/16.52	SR-73 to SR-39	0.003	0.31	1.21	0.005	0.30	0.90
5	16.52/20.75	SR-39 to SR-22	0.001	0.21	0.91	0.005	0.31	0.91
6	20.75/24.18	SR-22 to L.A. Co. Line	0.001	0.26	0.94	0.005	0.33	1.02

PROGRAMMED PROJECTS

For this report, major programmed projects are identified as major capacity enhancement and operational improvement projects programmed for construction beginning in State Fiscal Year '96-'97 or later. Projects are programmed into one of the three State Highway Programs: State Transportation Improvement Program (STIP), the State Highway Operations and Protection Plan (SHOPP), or the Traffic Systems Management Program (TSM). Some of the programmed projects may be partially funded or totally funded by local funding sources. Table 5 shows improvements of programmed projects that are related to traffic congestion on I-405 are:

**TABLE 5
PROGRAMMED PROJECTS**

PPN	RTE	PM	DESCRIPTION	EST \$	COMPLETED*
5000	405	5.6/7.8	SB AUX LANES BETWEEN CULVER & MacARTHUR	\$6,655M	12/03
4999A	405	6.8/7.6	CONST HOV DROP RAMPS	\$21.9M	9/04

4999C	405	7.6/9.6	CONST HOV CONNECTOR	\$33.7M	10/02
4999	405	7.6/9.6	CONSTRUCT HOV CONN & NEW RAMPS	\$87.0M	2/04
4999B	405	9.6/10.3	CONST HOV DROP RAMPS	\$19.6M	8/04
5030	405	10.2/12.4	MODIFY RAMPS & CONN AT 73/405	\$48.6M	5/04
5038	405	11.8/12.4	CONST NB AUX LANE	\$4.9M	2/01

*target date for completion

Legend

PPN = Planning and Program Number

PM = Postmile

ROUTE CONCEPT

Introduction

According to the California Motor Vehicle Stock, Travel and Fuel Forecast (November 1995) the expected growth in vehicle kilometers traveled (VKT) is 51% statewide between 1995 and 2020. The expected growth for Los Angeles, San Bernardino, Riverside, San Diego and Orange Counties combined is also 51%. Given this growth factor, it would be not practical to keep adding additional lanes to improve the LOS from a "F" level. The cost of purchasing additional right-of-way alone along the I-405 corridor would be costly.

The possibility of constructing HOV Direct Connectors at the mentioned interchanges will provide more incentive for HOV use and will provide operational improvements for mixed flow lanes. But even this will not be enough to relieve the congestion. Multi-modal solutions need to play more of a bigger part in reducing the number of vehicles that use I-405 such as increasing the express bus service, rail system, telecommuting, etc.

Also, the full implementation of Traffic Operation System elements (CCTV, ramp metering, CMS, etc., with tie-in to TMC) is strongly recommended as a means of managing the State Highway System in the urban areas of California. In the interest of cost savings and convenience to the motoring public these elements should be included in larger construction

projects wherever possible. See Appendix 4 and Appendix 5 for more detail on New Technology and Urban Freeway Standards respectively.

Regional Consistency

The route concept called for in this report is consistent with the SCAG's 1994 Regional Mobility Element (RME). The RME is the long-range regional transportation plan for the six counties in the Southern California Region. By law, all projects programmed in the Regional Transportation Improvement Program (RTIP) must be contained in the Regional Transportation Plan and have a funding source identified. Most of the major projects already programmed or planned for this route will meet this route concept. All projects currently programmed in the RTIP for I-405 are contained in the RME, therefore, this concept is consistent with regional planning efforts.

Caltrans and OCTA are in agreement on the following concept outlined for I-405.

This RCR is fully compatible with the RCR in District 7. The number of mixed flow traffic lanes match the ones that are called for in District 7's RCR. Once the HOV lanes under construction in District 7 are completed, there will be continuous HOV lanes the entire length of I-405.

Segment 1 PM 0.23/1.80 (From I-5 to SR-133)

Existing Facility: Freeway 6+2 HOV Lanes

LOS F3

Concept: Freeway 8+2 HOV Lanes and Aux

LOS F0

This segment operates as 6 through lanes plus 2 HOV lanes. With the closing of the El Toro Marine Corp Air Station in mid 1999, it is not known at this time how future development of this sight will impact I-405. See CURRENT ISSUES El Toro Marine Corp Air Station.

Segment 2 PM 1.80/8.74 (From SR-133 to SR-55)

Existing Facility: Freeway 8-10+2 HOV Lanes

LOS F3

Concept: Freeway 8-10+2 HOV and Aux

LOS F2

This segment operates as 8 - 10 through lanes plus 2 HOV lanes. To improve northbound congestion at SR-133, it is recommended to extend SR-133 northbound connector to auxiliary lanes. See CURRENT ISSUES Add Northbound Auxiliary Lanes at SR-133.

To improve southbound congestion between Culver Dr and MacArthur Blvd it is planned to construct Auxilliary lanes. See CURRENT ISSUES Add Southbound Auxilliary Lanes between Culver Dr and MacArthur Blvd

With the closure of the Tustin US Marine Corps Air Station, the proposed land use calls for low density housing along with supporting commercial development. The planning process has not determined what kind of impacts this will have on I-405. See CURRENT ISSUES Tustin US Marine Corps Air Station.

To improve congestion and to increase HOV usage, Direct Connector will be constructed at the SR-55/I-405 interchange. See CURRENT ISSUES SR-55/I-405 Direct Connector

Project.

Segment 3 PM 8.74/10.79 (From SR-55 to SR-73)

Existing Facility: Freeway 10+2 HOV Lanes

LOS F0

Concept: Freeway 8-10+2 HOV Lanes and Aux

LOS F0

This segment operates as 10 through lanes plus 2 HOV lanes. With the completion of the SJHTC, the approved PSR for the SR-73 widening included analysis of the potential for HOV Direct Connector between SR-73 and I-405. See CURRENT ISSUES SR-55/SR-73/I-405 improvements

Segment 4 PM 10.79/16.54 (From SR-73 to SR-39)

Existing Facility: Freeway 8-10+2 HOV Lanes

LOS F0

Concept: Freeway 10-12+2 HOV Lanes and Aux

LOS F2

This segment operates as 8 to 10 through lanes plus 2 HOV Lanes. SR-57 (Santa Ana Viaduct Expressway - SAVE) project is a proposed tollway that would extend SR-57 south to I-405 from the current southern terminus at I-5. The extension alignment would be above the Santa Ana River. See CURRENT ISSUES SR-57 Connectors.

Segment 5 PM 16.54/20.75 (From SR-39 to SR-22)

Existing Facility: Freeway 8+2 HOV Lanes

LOS F1

Concept: Freeway 10+2 HOV Lanes and Aux

LOS F0

This segment operates as 8 lanes plus 2 HOV lanes.

Segment 6 PM 20.75/24.18 (From SR-22 to L. A. Co. Line)

Existing Facility: Freeway 8-12+2 HOV Lanes

LOS F2

Concept: Freeway 8-12+4 HOV Lanes

LOS F0

This segment operates as 8 - 12 lanes plus 2 HOV lanes. In order to reduce weaving patterns within this segment, OCTA is in the process of preparing PR/ED for HOV lanes from SR-55 to I-605 and drop ramps. See CURRENT ISSUES SR-22/I-405/I-605 HOV lanes and Direct Connectors.

TRAFFIC OPERATIONS STRATEGIES (TOPS)

TOPS was proposed by Caltrans Districts 7, 8, 11 and 12 to maximize utilization of the existing urban freeway system through performance-based investment strategies. TOPS recommends improvements for this route, including programming, funding and comprehensive system management. A system wide concept report for Southern California is being developed. Full implementation of TOPS will take place over a 5-10 year span depending on the level of improvement required and available funding. As a result of TOPS,

the concept for this route anticipates Level of Service (LOS) of “E” or better with minimal delay to motorists and the trucking industry.

In the past, Caltrans Route Concept Reports focused on adding mixed flow or high occupancy vehicles lanes (HOV) in locations where the existing/projected traffic shows LOS “F” (stop and go condition). Widening alone is no longer the best solution to meet the existing and projected demand on the system.

Transportation professionals, looking for better ways to improve the overall performance of the system, believe the most cost effective and efficient solution is to maximize capacity on the existing facility and maintain a steady flow of traffic by implementing a series of traffic operations strategies. For example, freeway capacity for a 4-lane freeway is 9,200 vehicles per hour (2,300 vehicles per lane). During peak congestion with stop and go conditions, freeway capacity is reduced to about 6,000 vehicles per hour (1,500 vehicles per lane). If smooth, free flowing operational conditions could be maintained throughout the system, a freeway would carry about 30% more vehicles than a congested facility.

TOPS program is divided into three phases or levels of strategy. These levels are:

Level 1 which includes improvements such as traffic management system, a traffic information system, an incident response system, ramp and street access modifications, and freeway auxiliary lanes.

This strategy would:

- o Eliminate bottlenecks and choke points that cause stop and go conditions
- o Implement a computerized highway-ramp metering system that would operate ramp meters as a network by continuously reading freeway flow rates and determine appropriate metering ratio for all on-ramps within the system, and,
- o Re-stripe freeway lanes or add auxiliary lanes to avoid weaving and congestion ‘hot spots’.

Level 2 strategy concentrates on the High Occupancy Vehicle (HOV) system and includes HOV drop ramps, HOV freeway to freeway connections, and HOV gap closures.

Level 3 strategy would provide freeway interchange modifications and new lane miles where required.

The effects of the strategies on the TOPS is shown by the LOS Comparison Chart on the following page.

ADT Summary Table page 23 shows a more detailed information.